

WHAT IS CLAIMED IS:

1. A bandpass filter, comprising:

a plurality of resonators that are electromagnetically coupled to each other, each resonator having a terminal coupled to a ground;

a bypass line in parallel with said plurality of resonators, said bypass line having a bypass line input coupled to a first resonator of said plurality of resonators and a bypass line output coupled to a second resonator of said plurality of resonators;

an input, coupled to said first resonator; and

an output coupled to said second resonator.

2. The bandpass filter of claim 1, wherein said resonators are quarter wavelength transmission lines.

3. The bandpass filter of claim 2, wherein said quarter wavelength transmission lines are microstrip transmission lines, said microstrip transmission lines printed in a spiral pattern.

4. The bandpass filter of claim 3, further comprising:

an input capacitor coupled between said input and said first resonator; and

an output capacitor coupled between said output and said second resonator.

5. The bandpass filter of claim 4, wherein said input capacitor and said output capacitor are printed finger capacitors.

6. The bandpass filter of claim 4, further comprising:

a bypass line input coupler, coupled between said bypass line and said first resonator;

201601020907

a bypass line output coupler, coupled between said bypass line and said second resonator.

7. The bandpass filter of claim 6, wherein said plurality of resonators includes a third resonator coupled between said first resonator and said second resonator.

8. The bandpass filter of claim 7, further comprising:

a precision substrate, wherein said plurality of resonators, said bypass line, said input capacitor, said output capacitor, said bypass line input coupler, and said bypass line output coupler are printed on said precision substrate.

9. The bandpass filter of claim 1, wherein an input impedance and an output impedance are a desired value.

10. A bandpass filter comprising:

an input coupled to an input capacitor;

an output coupled to an output capacitor;

a first resonator coupled to a ground, said input capacitor, a first intercoupler and a bypass line input coupler;

a second resonator coupled to said ground, a second intercoupler, a bypass line output coupler, and said output capacitor

a third resonator coupled to said ground, said first intercoupler, and said second intercoupler, wherein said first resonator, said second resonator and said third resonator are electromagnetically coupled quarter wavelength transmission lines;

a bypass line coupled between said input bypass line coupler and said output bypass line coupler; wherein said bypass line causing improved image channel signal rejection at said output; and

a precision substrate, wherein said first resonator, said second resonator, said third resonator, said bypass line, said input capacitor, said output capacitor,

said bypass line input coupler, and said bypass line output coupler are printed on said precision substrate.

11. The bandpass filter of claim 10, wherein said input capacitor and said output capacitor are printed finger capacitors.

12. A differential bandpass filter, comprising:

a plurality of resonators that are electromagnetically coupled to each other, each resonator having a terminal coupled to a ground;

a first bypass line; in parallel with said plurality of resonators, said bypass line having a bypass line input coupled to a first resonator and a bypass line output coupled to a second resonator;

a first input, coupled to said first resonator;

a first output coupled to said second resonator.

a second plurality of resonators that are electromagnetically coupled to each other, each resonator having a terminal coupled to said ground;

a second bypass line; in parallel with said second plurality of resonators, said second bypass line having a second bypass line input coupled to a third resonator and a second bypass line output coupled to a fourth resonator;

a second input, coupled to said third resonator; and

a second output coupled to said fourth resonator.

13. A bandpass filter, comprising:

an input;

an output;

filtering means, coupled between said input and said output, for passing a desired frequency band to said output; and

frequency attenuating means, coupled between said input and said output, for attenuating a frequency component of said signal.

14. The bandpass filter of claim 13, further comprising:

shielding means for shielding the filter periphery, wherein said shielding reduces the amount of said signal bypassing at least one of said filtering means and said frequency attenuating means.

15. A double conversion tuner, comprising:

a tuner input;

a variable gain amplifier, coupled to said tuner input;

a first mixer coupled to a first local oscillator and said low noise amplifier;

a printed bandpass filter, coupled between said first mixer and a second mixer, including:

a plurality of resonators that are electromagnetically coupled to each other, each resonator having a terminal coupled to a ground;

a bypass line; in parallel with said plurality of resonators, said bypass line having a bypass line input coupled to a first resonator and a bypass line output coupled to a second resonator;

a bandpass filter input, coupled to an output of said first mixer;

a bandpass filter output coupled to an input of said second mixer;

a second local oscillator, coupled to said second mixer;

a second IF bandpass filter coupled to said second mixer and a variable gain amplifier; and

a tuner output, coupled to said variable gain amplifier.

16. The double conversion tuner of claim 15, wherein said printed bandpass filter is a differential bandpass filter.

17. The bandpass filter of claim 7, further comprising:

a first intercoupler that weakly couples said first resonator to said third resonator; and

a second intercoupler that weakly couples said third resonator to said second resonator.